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ABSTRACT

Singapore has attempted to use school-based intervention studies as a vital feedback system in developing a more viable and sensitive preservice curriculum. The Institute of Education (IE), the sole trainer of teachers in Singapore, is conducting ongoing research in the area of effective teaching strategies, which aims at assessing the effectiveness of methods used in fostering learning strategies and metacognitive skills in students of varied background characteristics in English and mathematics studies. Data from two concurrent studies provide information on IE students and secondary pupils' learning strategies and academic ability. A sample is presented of differential learning behaviors of pupils from three different ability streams: special, express, and normal. Findings from a questionnaire submitted to teachers indicated that the teachers' perceptions of effective strategies did not seem to match their pupils' experiences with the strategies. However, the pupils' ability seemed to influence the teachers' perception of the effectiveness of the learning strategies. Preservice teachers need to know that all pupils, irrespective of ability, should be taught the use of effective learning strategies. A brief description is given of the continuing second phase of this study; four tables displaying the data are appended. (JD)

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SCHOOL-BASED INTERVENTION AND PRE-SERVICE TRAINING IN EFFECTIVE LEARNING STRATEGIES

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Good teaching includes teaching students how to learn new information and skills, how to remember, how to think and how to motivate themselves (Weinstein and Underwood, 1982; Weinstein and Mayer, 1986). Yet these learning strategies are seldom taught. Instead educational research and development effort have been directed mostly at the improvement of teaching. The neglect of the learning aspect is myopic and serves as a limiting factor to effective teaching. Norman (1980) wisely puts forward this compelling argument:

"It is strange that we expect students to learn yet seldom teach them about learning. We expect students to solve problems yet seldom teach them about problem solving ....."

We need to develop the general principles of how to learn, how to remember, how to solve problems, and then to develop applied courses, and then to establish the place of these methods in an academic curriculum" (pg 97).

Teaching students life-long skills to handle the ever increasing influx of information and problem for the environment should be a major goal of present-day educational system. With increased urbanization, modernization and technological advancement, such a goal would take on increasing importance.

Such a concern now has far reaching implications for teacher education and practice. Teachers will need to achieve dual goals in the classroom:

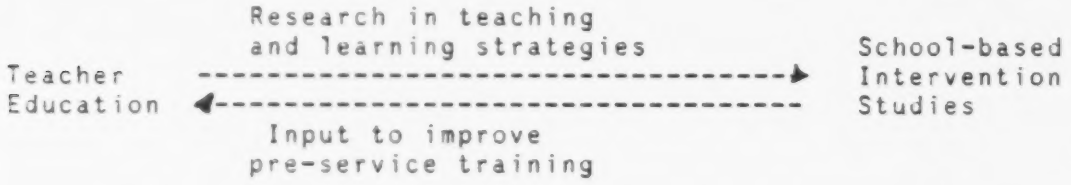
1) Goals concerning the products of learning and
2) Goals concerning the processes of learning.

In recent years, more and more research evidence indicates that substantial variance in learning outcomes can be attributed to learning approaches adopted by pupils (Marton, 1976; Marton and Saljo, 1976; Svensson and Theman 1983; Marton and Saljo, 1984; Biggs, 1987; Chew, 1988; Chang, 1989).

A number of learning strategies curricula have been developed to investigate classroom application or intervention with students. Dansereau (1985), McCombs (1981) and, Weinstein and Underworld,

(1985) have all concentrated on creating adjunct programmes for post-Secondary students in job or college settings. Most learning strategies instructional programmes have been able to report substantial gains in academic performance in post-intervention assessment. College level success with a learning strategies programme has encouraged experimental work also to be carried out at kindergarten, elementary and higher school levels. McCombs (1981, 1982a, 1982b) has developed learning strategies materials in the area of time management, study skills and self-motivation. Implementation of these learning strategies materials has led to improved test results and increases in motivation and ability to be self-accountable for learning.

These findings are thought-provoking. Though exciting results have been obtained in the experimental implementations of the many learning strategies programmes, very little has been known of or written on the use of these data in improving pre-service training. But research and development should be an important component of education and serves to forge a strong link between school and teacher training. Unless such a feedback system is consciously established, teacher training may fail to meet the needs of pupils and the practices in schools.



Two-way relationship between Teacher Education and School-based Intervention Studies.

Pre-service training in teacher education aims at preparing young, inexperienced teachers in meeting the varying needs of different pupil types and the demands of individual country's education system. Hence continuous feedback from school-based studies is very vital in keeping the pre-service curriculum viable. In turn, the teacher trainees will benefit from the information derived from the studies carried out in the local schools, helping them to be conscious of the existing learning problems of the pupils. In addition, teaching and learning strategies which have been proven effective with the different pupil types will be valuable information for the teacher trainees. This piece of knowledge prepares them better for their entry into their vocation.

For a young industrialized nation like Singapore where manpower is the only resource, it is imperative for it to maximise the potentials of its citizens through heavy investments in education and training. The New Education System introduces streaming as a means of reducing attrition at the primary and secondary levels. This paper hopes to present the Singapore attempt in using school-based intervention studies as a vital feedback system in developing a more viable and sensitive pre-service curriculum.

IE-ERU Project on Effectiveness of Learning Strategies

IE, being the sole trainer of teachers in Singapore, is conducting on-going research in the area of effective teaching strategies. Hence this project entitled "Effectiveness of Learning Strategies" aims at assessing the effectiveness of methods used in fostering learning strategies and metacognitive skills in students of varied background characteristics. The findings will then be incorporated into the curriculum for IE trainees. There are 2 Phases to the Project:

Phase I (1988-1989) focused on two concurrent Studies A and B. Study A attempts to collect data on the learning strategies and metacognitive processes currently used by IE student teachers and secondary pupils in school through the use of questionnaires and interviews. Secondary teachers' views on the teaching of learning strategies and metacognitive processes in their respective subjects were also solicited. Study B focuses on the evaluation of the effectiveness of some methods used in fostering learning strategies and metacognitive processes in pupils. Experimentation in the teaching of learning strategies was carried out by selected Dip. Ed students during their Teaching Practice.

Data from Study A and Study B provide information on IE students and secondary pupils' learning strategies and their academic ability. A sample of differential learning behaviour of pupils from different ability streams (Special, Express, Normal) is presented in Tables 1 and 2. When it comes to items indicating effort and preparation for lessons and examinations, the Normal pupils claimed to have put in greater investment. The following strategies found favour with the Normal pupils:

English

1 I come prepared for my next lesson by reading ahead of my class lesson or by reading my notes.

2 I plan and keep a strict revision timetable before an exam.

3 I keep notes of mistakes and their corrections so that they will not be repeated.

4 In studying the language, I spent most of my time memorizing new words/terms and rules.

Mathematics

1 I write down a summary after reading each chapter.

2 I hold group discussions with my friends/classmates.

3 I underline the key words in examination questions.

From the above strategies, it can be perceived that the Normal pupils in the sample did not invest their time and effort wisely in using appropriate strategies. Most importantly, they did not seem to understand the special features of the subjects, English and Mathematics. English mastery requires constant and frequent use of the language with confidence. In addition to drill and practice, Mathematics requires understanding of its basic concepts and princples in order to achieve creditable results. But it was the Special pupils who used the effective learning strategies more frequently compared with the Express and Normal pupils. The following strategies were frequently used by the Special pupils:

English

1 I turn an explanation/arguments over in my mind a number of times before accepting it.

2 I make it a point to ask questions when in doubt.

3 I like to use the language at every given opportunity.

Mathematics

1 I try to think through the difficulties/problems in my lesson first before turning to others for help.

2 In studying this subject, I feel that I have to work on it every day.

3 In my revision, it is important to me to be able to solve questions/problems set in past year examination papers.

4 I try to think of different ways to solve a problem/answer a question.

5 I find that drawing diagrams helps me to solve problems.

Responses from the Teacher Questionnaire sprang some surprises and offered some important implications to teacher training at the pre-service level (Tables 3 and 4). It is found that the teachers attached to the Special schools were the ones who gave the lowest ratings to many of the strategies listed as important for effective learning. For example, they rated paying careful attention to explanation in the English class much lower than teachers teaching the Express and Normal pupils. Drill and practice in learning English was also considered unimportant. Writing letters/diary and accepting corrections of mistakes in speaking the language were other ineffective strategies in the view of the Special teachers. Similarly, the Mathematics teachers in the Special Stream considered the use of graphs, and diagrams in remembering information as relatively unimportant. Their ratings on the items "Relating new materials to old materials" and "Organizing work in neat steps helps one to learn better" were much lower than the teachers in the Normal stream. They also did not believe that mental pictures would help in comprehending a Mathematics lesson. The teachers teaching the Normal classes rated most of the strategies provided highly.

These findings concurred with the earlier results obtained in the pilot study. Teachers in the pilot study felt that pupils from different grades and streams should be taught different strategies. This contrasts sharply with the picture presented earlier by the pupils from the Special, Express and Normal streams. Teachers' perception of effective strategies does not seem to match their pupils' experiences with the strategies. The finding implies that pupils' knowledge of learning strategies is not necessarily learnt in the classroom. But the ability of the pupils does influence the teachers' perception of the effectiveness of learning strategies. Teachers handling the high ability Special pupils tended to believe that these pupils can do well without much effort and the practice of learning strategies. This is of concern as the complacent attitude displayed can spell trouble if the teacher is given weak classes or classes of mixed abilities to teach. The weaker pupils need more guidance in the effective ways of learning. The attitude of the teachers will determine the approach and style of teaching adopted by her. Hence pre-service teachers must be impressed upon that all pupils, irrespective of ability should be taught the use of effective learning strategies, keeping in mind the need to exercise flexibility across grades and streams.

An attempt to match the strategies used by pupils from the different streams with those perceived as important by their respective teachers yield some revealing and disturbing results. These findings and the experiences culled from Study B formed the base-line information for the school-based intervention in Phase II.

Phase II (1990)

For the next phase, it was considered a more plausible arrangement to invite schools interested in research to participate in the study. There are many advantages in having teachers in service to carry out the experiment instead of trainees. Teachers in service would be more confident and experienced. Moreover, schools which opt to take part in the project would give their teachers the necessary moral and material support. Instead of just ten weeks, the experiment could be conducted and monitored for a longer duration.

Two Government Secondary Schools were invited to participate in the Project. Bendemeer Secondary School is keen to experiment with Intervention in English while Serangoon Garden Secondary School prefers to try intervention in Mathematics. The selected teachers from the two schools worked closely with Project members in the January term in 1990 to prepare for the implementation of the Intervention Programme in the second term. The intervention is scheduled to spread over two terms. Two teachers from each school are chosen to be the experimenters, one teaching an experimental class and a control class in the Normal stream and the other the other the Express stream. In this way, we would be able to make comparisons between the experimental and control classes and between the Normal and Express streams. Classroom implementations would be monitored from time to time. Besides using the Mid-Year and Final Examinations as summative assessments, formative assessments would also be designed by project members and the intervention teachers of the schools.

A Mathematics Intervention Project in ~~Bendemeer~~ Serangoon Garden Secondary School (March - August 1990)

This project is led by the Mathematics sub-group head Dr Philip Wong.

1 Subjects: Four Secondary 1 classes, two from the Normal stream and two from the Express stream participate in the intervention programme.

2 Design:

Experiment	Control	Teacher
Express 1A	Express 1B	1 teacher
Normal 1E	Normal 1H	1 teacher

3 Instrumentation and Measures

3.1 Covariate measures : PSLE Mathematics scores of pupils

3.2 Pre-test measures

a) Study skills Questionnaire (Wong)
b) Mathematics Attitude Inventory

3.3 Post-test measures

a) Study Skills Questionnaire (Wong)
b) Mathematics Attitude Inventory
c) Achievement Scores

3.4 Qualitative measures

a) Verbal reports - interviews with randomly selected pupils, verbal protocols when solving problems

b) Analysis of note books

4 Treatment for Experimental Groups

4.1 Building Mathematics Vocabulary

Pupils prepare their own vocabulary and terminology notebook with terms explained in pictures, diagrams or examples.

4.2 Creating own examples

Pupils are encouraged to generate their own examples and non-examples of problems after the teacher has given them an example of a problem.

4.3 Building experience with rational statements

Pupils are encouraged to write rational statements (eg. 5 times older than, twice as much) and construct their own sentences and example problems.

4.4 Play the examiner game

After some class exercises, the teacher highlights the special features of the problems and shows pupils how to set questions. Pupils are encouraged to create problems for their problems to solve. The teacher randomly selects questions set by pupils for class tests.

5 Control classes are given only normal classroom activities.

6 Results of the Interview and Think-Aloud Sessions held in April 1990

It is heartening that the results showed that the Experimental pupils from both the Express and Normal classes did better than the Control Group. They showed through the observation sessions, talk-aloud sessions, interviews and their class tests that they were more aware of the semantic structure of problems and possessed better mental perceptions of the problems.

B English Intervention Project in Bendemeer Secondary School (July - November 1990)

Dr Vanithamani worked with two enthusiastic young teachers on using Metalinguisitic Awareness as the approach to language intervention in Bendemeer Secondary School. Intervention is introduced at the Secondary Three (Grade 8) level.

Three components of the Metalinguistic Awareness are selected as intervention strategies:

a) Semantic Mapping (vocabulary building involving words and concepts)

b) Syntactic Development (sentence combining)

c) Discourse Analysis (text analysis of different types of academic language)

The Experimental-Control design is also applied to the English Intervention Project.

In April and May 1990, the two experimental teachers spent time reading on the concepts behind the three strategies and experimenting with exercises on Syntactic Development. The teachers modified some of the exercises to make them more suitable for the classes they were teaching.

In July, Dr Vanithamani and the two experimental teachers plan to move on to Discourse Analysis which consists of text analysis, corrections within texts, meanings within texts going beyond the sentence level.

Monthly tests will be used as measures of progress made by pupils during the intervention.

CONCLUSION

The Intervention Projects are in their infancy stage and would probably take some time to bring about significant results. Modification to the strategies will also be necessary to overcome teething problems. For both school-based interventions, intense and extensive discussions took place between the project leaders, principals and teachers to identify the existing weaknesses in the pupils and the most suitable strategies for intervention before the programme was drawn-up for the respective school.

The results coming in from the Mathematics Project are promising. These findings and those gathered earlier from Phase I would provide valuable input in the pre-service training curriculum. Pre-Service teachers would be alerted to the need for the teaching of learning strategies to their pupils irrespective of stream and not to focus narrowly only on their own teaching strategies. Effective teaching can only be reflected through effective learning. They must not be lured by the belief that better pupils can do well on their own and become complacent in their attempt to help pupils to learn well. There are always some underachievers in even the best classes. Strategies in the different subjects tested and found effective with pupils from different streams would be introduced to the trainees who would then be encouraged to try them out during their teaching practice. The long term goal is to help pupils to learn effectively and to cut down unnecessary attrition in the education system. Effective learners are better adjusted and happier people!

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TABLE 1: LEARNING BEHAVIOUR OF SIGNIFICANT DIFFERENCE BETWEEN THE DIFFERENT STREAMS IN ENGLISH

	ITEMS	SPECIAL (N=210)	EXPRESS (210)	NORMAL (188)	F	P
1	I write down a summary after reading each chapter.	1.76	1.79	2.09	4.53	0.01
2	I only go over my lessons the night before the test or an exam.	2.42	2.80	2.54	3.73	0.02
3	I come prepared for my next lesson by reading ahead of my class lesson or by reading my notes.	2.38	2.34	2.76	6.68	0.001
4	I plan and keep a strict revision timetable before an exam.	2.93	2.76	3.12	3.05	0.05
5	I check my answers with my friends/the answers given in the book.	3.81	3.99	3.64	4.07	0.02
6	I keep notes of mistakes and their corrections so that they will not be repeated.	2.93	2.95	3.36	5.42	0.005
7	I hold group discussions with my friends/ classmates.	2.03	1.99	2.54	12.14	0.001
8	I turn an explanation/ argument over in my mind a number of times before accepting it.	3.44	3.26	3.04	4.27	0.015
9	I underline the key words in examination questions.	2.55	2.71	3.06	5.77	0.003
10	I make it a point to check my answer to a question/problem before handing in my paper.	4.16	4.02	3.83	3.90	0.02
11	I only read about things/topics I need to learn.	2.78	2.98	3.22	4.79	0.009

	ITEMS	SPECIAL (N=210)	EXPRESS (210)	NORMAL (188)	F	P
12	I put down the main points of a topic/ chapter and number them on a card for my revision.	2.21	2.27	2.74	8.20	0.003
13	Before starting a test, I plan how much time to spend on each section of the test.	2.93	2.53	2.94	4.64	0.01
14	In studying the language, I spent most of my time memorizing new words/terms and rules.	2.61	3.03	3.08	6.31	0.002
15	I find difficulty in learning the language because I do not know the meaning of words.	2.60	3.21	3.18	10.78	0.0001
16	I listen to good radio programmes.	2.42	2.71	3.09	9.52	0.0001
17	I need a lot of drill and practice in learning the language.	3.33	3.80	3.65	5.28	0.005
18	I make it a point to ask questions when in doubt.	3.44	3.27	3.04	4.27	0.015
19	I like to use the language at every given opportunity.	3.93	3.67	3.31	9.76	0.0001

TABLE 2: LEARNING BEHAVIOUR OF SIGNIFICANT DIFFERENCE BETWEEN THE DIFFERENT STREAMS IN MATHEMATICS

	ITEMS	SPECIAL (N=168)	EXPRESS (219)	NORMAL (170)	F	P
1	I write down a summary after reading each chapter.	1.71	1.62	2.01	5.41	0.005
2	I think/reflect and try to understand the important points learned after every lesson.	3.49	3.72	3.39	3.29	0.04
3	I stop to check what I remember after reading each section in a chapter.	3.27	3.08	2.92	2.96	0.05
4	I use the questions at the end of a chapter as a guide in my study.	3.38	3.23	2.70	11.24	0.0001
5	In studying this subject, I feel that I have to work on it every day.	3.80	3.55	3.29	5.92	0.003
6	I check over my test to avoid making mistakes.	4.15	4.07	3.78	4.23	0.02
7	I listen carefully to explanations so that I can remember and use the information later on.	4.05	3.95	3.69	4.88	0.008
8	I only go over my lessons the night before a test or an exam.	2.39	2.76	2.72	3.36	0.04
9	I come prepared for the next lesson by reading ahead of my class or by reading my notes.	2.38	2.16	2.51	3.45	0.03
10	I try to think through the difficuties/problems in my lesson first before turning to others for help.	4.11	4.16	3.69	8.89	0.0002
11	I check my answers with my friends/the answers given in the book.	4.40	4.21	3.58	24.19	0.0001

	ITEMS	SPECIAL (N=168)	EXPRESS (219)	NORMAL (170)	F	P
12	I hold group discussions with my friends/ classmates.	2.09	1.97	2.47	8.01	0.0004
13	I enjoy learning this subject.	3.85	3.74	3.44	3.86	0.02
14	I turn an explanation/ argument over a number of times before accepting it.	3.22	3.27	2.81	6.65	0.001
15	In my revision it is important to me to be able to solve questions/ problems set in past year examination papers.	4.11	4.07	3.48	14.66	0.0001
16	I underline the key words in examination questions.	2.54	2.63	2.94	3.29	0.04
17	I make it a point to check my answer to a question/problem before handing in my paper.	4.18	4.24	3.74	9.19	0.0001
18	I put down the main points of a topic/ chapter and number them on a card for my revision.	2.16	2.34	2.81	10.06	0.0001
19	In studying the subject, I feel that I should work on broad ideas/ problems rather than on detail	2.87	3.21	2.89	3.72	0.03
20	When studying the subject, I find it important to understand the meaning of terms to be learned.	3.57	3.83	3.38	5.28	0.005
21	I need a lot of drill and practice in learning the subject.	3.99	4.04	3.67	4.35	0.01
22	It is necessary to time myself to see how fast I can work.	3.17	2.91	2.76	3.24	0.04

	ITEMS	SPECIAL (N=168)	EXPRESS (219)	NORMAL (170)	F	P
23	I need to attend to the instructions carefully in order to get the required results/ observations.	3.83	4.00	3.27	14.21	0.0001
24	It is important for me to understand and analyse the given/ collected information and draw conclusions/ references from the results.	3.58	3.59	3.13	6.23	0.0002
25	I try to use obtained information to prove principles, laws and theories.	3.23	3.17	2.68	7.33	0.0007
26	I try to remember definitions, rules and formulate by repeating them aloud.	3.27	3.01	2.78	4.52	0.01
27	I try to think of different ways to solve a problem/answer a question.	3.33	3.42	3.05	3.42	0.03
28	Organizing my work in neat steps helps me to learn/do better.	3.80	4.05	3.45	9.58	0.0001
29	I find that drawing diagrams helps me to solve problems.	3.42	3.44	3.00	4.94	0.0008
30	I memorize model answers.	2.01	2.57	2.77	13.20	0.0001
31	I pose questions to myself after every chapter to check my understanding and recall.	2.54	2.79	2.96	3.66	0.03

Table 3: Teachers' responses to strategies important for effective learning in English

STRATEGIES	EXPRESS N = 8	NORMAL N = 12	SPECIAL N = 9
1. Going over the errors made in a test and trying to understand why the mistakes were made.	4.63	4.25	4.26
2. Writing down a summary after reading each chapter.	3.25	3.92	2.44
3. Before answering a question, organize the facts to be written.	4.63	4.1	3.78
4. Develop an interest in the subject.	4.63	4.17	3.78
5. Stop to check what can be remembered after reading each section in a chapter.	3.13	4.00	2.67
6. To remember better, check main headings and the summary before reading a chapter/article.	4.13	4.08	2.67
8. Listen carefully to explanations to help in remembering and using the information later on.	4.13	4.17	3.33
9. Plan and keep a strict revision timetable before an examination.	4.25	4.08	3.33
10. Check answers with friends/ the answers given in the book.	3.75	3.42	2.78
11. Hold group discussions with friends/classmates.	4.13	3.92	3.67

STRATEGIES	EXPRESS N = 8	NORMAL N = 12	SPECIAL N = 9
12. Take a greater interest in a lesson if the aims of the lesson and its usefulness are known and explained.	4.25	3.33	4.44
13. Spend time to recall the key points and write a brief outline to examination questions/ assignments/problems.	3.38	3.75	4.11
14. Make it a point to check the answer to and question/problem before handing in the examination paper.	4.50	4.17	3.89
15. Using abbreviations/ acronyms for terms/ places/names helps one to remember.	4.00	3.83	2.78
16. Make it a point to read over notes/text a number of times to understand and identify the important points.	3.63	3.92	4.22
17. Memorize new words/terms and rules.	3.38	2.67	2.33
18. Memorize the spelling of new words.	3.38	2.92	2.44
19. Need a lot of drill and practice in learning the language.	4.13	3.3	2.33
20. Make it a point to ask questions when in doubt.	4.63	3.83	4.22
21. Express views and answer questions in class.	4.75	3.92	3.78

STRATEGIES	EXPRESS N = 8	NORMAL N = 12	SPECIAL N = 9
22. Find out what other people think of one's views/ expressions/answers spoken in the language.	4.13	3.33	3.44
23. Watch good TV programmes in order to improve spoken language.	4.88	3.83	3.33
24. Read newspapers/books/ magazine to improve language and general knowledge.	4.88	4.08	4.22
25. Write letters/diary in the language in order to improve mastery of the language	4.38	3.42	2.56
26. Welcome others to correct mistakes made in speaking the language	3.63	3.83	2.67
27. Listen to good radio programmes.	4.38	3.42	3.56
28. Memorize proverbs and idioms and use them in speech and writing.	3.25	2.67	1.89

Table 4: Teachers' responses to Strategies important for effective learning in Mathematics

STRATEGIES	EXPRESS N = 9	NORMAL N = 5	SPECIAL N = 7
1. Make notes from suggested reading and put them together with class notes on a topic.	2.89	3.80	2.86
2. Relating new materials to old materials.	4.78	4.60	4.14
3. Before answering a question, organize the facts to be written.	3.33	5.00	3.00
4. Stop to check what can be remembered after reading each section in a chapter.	3.33	4.00	3.29
5. Use the questions at the end of a Chapter as a guide in one's study.	3.67	4.40	3.71
6. To remember better, check main headings and the summary before reading a chapter/article.	3.11	3.60	2.57
7. Check over a test to avoid making mistakes.	3.78	4.40	4.43
8. Go over and check notes immediately after lesson to fill in missing bits.	2.78	3.80	3.14
9. Listen carefully to explanations to help in remembering and using the information later on.	3.78	5.00	4.43
10. Come prepared for the next lesson by reading ahead of the class lesson or by reading the notes.	3.33	4.40	2.57
11. Check answers with friends/ the answers given the book.	2.89	3.60	3.71

STRATEGIES	EXPRESS N = 9	NORMAL N = 5	SPECIAL N = 7
12. Hold group discussions with friends/classmates.	3.33	4.20	3.57
13. Turn an explanation/ argument over in one's mind a number of times before accepting it.	2.89	4.40	3.57
14. Rewriting notes and questions in one's own words.	2.44	2.80	1.86
15. Take a greater interest in a lesson if the aims of the lesson and its usefulness are known and explained.	3.89	4.40	3.57
16. Underline key words in examination questions.	3.11	4.40	3.29
17. Make it a point to check the anwer to a question/ problem before handing in the examination paper.	3.78	4.60	4.00
18. It is easier to remember facts if they are grouped under meaningful headings.	3.78	4.40	2.71
19. Make it a point to read over notes/text a number of times to understand and identify the important points.	3.44	4.20	3.14
20. Plan how much time to spend on each section of the test.	3.89	4.40	3.86
21. Understand the meaning of terms to be learned.	3.78	4.60	4.29
22. Make an effort to see the relationships between various topics/events/ concepts.	3.89	4.60	4.14

STRATEGIES	EXPRESS N = 9	NORMAL N = 5	SPECIAL N = 7
23. Relate new knowledge to daily life experiences.	3.44	4.20	3.29
24. It is easier to remember information by using graphs, charts, or diagrams.	3.89	4.80	3.14
25. Organizing the many key points in a lesson into an outline/a flow-chart/ a diagram helps in its revision.	3.11	4.20	2.43
26. Need to attend to instructions carefully in order to get the required results/ observation.	3.11	5.00	4.00
27. It is important to understand and analyse the given information draw conclusions/ inferences from the results.	3.33	4.60	3.71
28. Use obtained information to prove principles, laws and theories.	3.11	4.40	3.43
29. Try to remember definitions, rules and formulae key writing them out a number of time.	3.11	3.80	3.57
30. It helps to understand the lesson by comparing and contrasting 2 sets of data/ information.	2.67	3.40	2.71
31. There is only 1 best way to solve a problem/ question.	2.78	2.00	1.86
32. Organising work in neat steps helps one to learn better.	3.67	5.00	3.71

STRATEGIES	EXPRESS N = 9	NORMAL N = 5	SPECIAL N = 7
33. Drawing diagrams helps in the solving of problems.	3.67	4.60	4.00
34. Pose questions to oneself after every chapter to check one's understanding and recall.	2.67	3.80	3.57
35. Use mental pictures in comprehending a lesson.	2.33	4.00	2.43